

# ARMY PROGRAMS

## Aerial Common Sensor (ACS)

### SUMMARY

- The Army and Navy selected Lockheed Martin as the prime contractor for the Aerial Common Sensor (ACS) in 2004. The aircraft is a modified Embraer 145 regional jet.
- The ACS program passed Milestone B in 2004 and entered the System Development and Demonstration phase.
- With a selected prime contractor, the Army-only Test and Evaluation Master Plan requires updating to include Navy requirements and identify further testing requirements.



*The ACS will provide timely and accurate detection, threat identification, target tracking, and precision geolocation of highly mobile and moving targets.*

### SYSTEM DESCRIPTION AND MISSION

The ACS is an intelligence, surveillance, and reconnaissance system that was originally an Army program.

The ACS system consists of four major components:

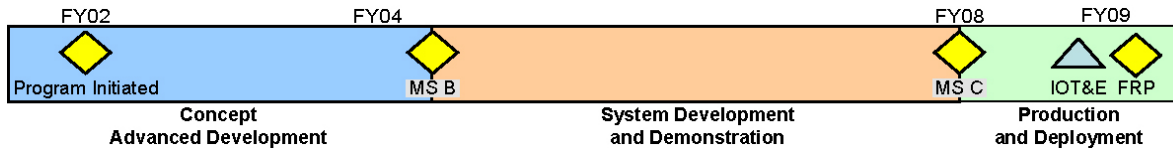
- The aircraft
- The sensor payload
- The data link
- The processing capabilities in Army and Navy ground stations

The aircraft will be a modified Embraer 145 regional jet aircraft that is capable of worldwide deployment, ready to fight anywhere on the globe within 72 hours. The commercial off-the-shelf Embraer 145 will have significant modifications, including upgraded avionics, a 10-foot increase in wingspan, upgraded engines for increased thrust, and upgrades to increase the takeoff weight. The sensor payloads consist of multi-intelligence (MULTI-INT) systems that include a mix of sensors for signals intelligence, including communications intelligence, electronic intelligence, as well as imagery intelligence and electro optical/infrared sensors. The imagery intelligence sensors include synthetic aperture radar and moving target indicator radar modes. The data links include direct line-of-sight communications to ground stations within the theater of operations or satellite communications. They can send intelligence data back to a home station operations center within the United States, or to a secure rear area. The Distributed Common Ground System-Army and Distributed Common Ground Station-Navy will serve as the ground stations for the ACS aircraft. Much of the software required to process intelligence data from the ACS will be resident at the ground stations.

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The ACS will replace the Army's current Guardrail Common Sensor and Airborne Reconnaissance-Low aircraft and the Navy's current EP-3E aircraft. The Army's Guardrail Command Sensor and Airborne Reconnaissance-Low aircraft fall short in meeting the requirement for deployment to a distant battlefield in a timely manner in advance of, or with, early entry forces. Replacement of the entire fleet of the Navy's aging EP-3 aircraft is required. The ACS will provide timely and accurate detection, threat identification, target tracking, and precision geolocation of highly mobile and moving targets. The ACS will support force protection, force maneuvers, targeting, and battle management operations.

## TEST AND EVALUATION ACTIVITY



The ACS program completed a series of technology demonstrations in FY03. Two different contractor teams participated in the technology demonstration phase. Each contractor team set up a series of demonstrations in their systems integration labs to reduce the risk to the signals intelligence sensor design, MULTI-INT integration, and man-machine interface design. The contractors had to demonstrate their ability to meet key performance parameters and demonstrate mature system architecture. The government approved the plans for the demonstrations and then subsequently observed their execution. Data and other analyses supported a contract award to Lockheed Martin in FY04.

The ACS program completed an Army-only Test and Evaluation Master Plan in FY03 that lays out a robust test program. A series of developmental tests will verify the ACS has achieved its technical performance goals, including airworthiness certification of the aircraft and performance specifications for the various sensors. Force developmental tests and experimentation will focus on developing and refining the tactics, techniques, and procedures required to operate the system. The operational test phase will assess the ability of the ACS to accomplish its MULTI-INT, surveillance, and reconnaissance missions in support of a range of different operations.

The Navy will utilize a significant portion of the testing provided by the Army. The current Test and Evaluation Master Plan requires an update to include specific testing, which is unique to the Navy's requirements.

## TEST AND EVALUATION ASSESSMENT

The technology demonstration phase conducted in FY03 allowed the Army and Navy to assess the technology readiness level of the signals intelligence and MULTI-INT portions of the ACS system. The technology was sufficiently mature to proceed to the System Development and Demonstration phase. The demonstrations also provided valuable information in selecting a system contractor.

Several issues need to be resolved to ensure successful execution of the ACS program. The ACS calls for the MULTI-INT integration of communications intelligence, electronic intelligence, imagery intelligence, and electro-optic/infrared sensors onto a single aircraft. This integration will be complex and will have to overcome the potential co-site interference between the different sensors. Processing the data from the different sensors will also require a system architecture that can prosecute MULTI-INT missions at both the aircraft and at the Distributed Common Ground System-Army and Distributed Common Ground Station-Navy ground stations. The ACS will also need to be interoperable and integrated with Joint Service networks to conduct joint operations with other Services. Concerns that still need to be resolved include size, weight, and power requirements necessary to carry and operate the MULTI-INT sensor payload and growth margin to add systems and capabilities in the future. Major changes to the commercially-flown Embraer 145 airframe will require significant systems development and integration. Assessing the impact of these changes on the performance of the aircraft will require significant testing.